



**Transport**  
Roads & Maritime  
Services

# Test method T631

## Coring of road construction materials

NOVEMBER 2012



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## Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added	D.Dash	Jan 2000
Ed 2/ Rev 0		New Issue. Incorporate wet & dry requirements. Diagrams removed. Title Revised	D Hazell	Jan 2009
Ed 3/ Rev 0	All	Reformatted RMS tekplate	J. Friedrich	November 2012

Note that Roads and Maritime Services is hereafter referred to as 'RMS'.

The most recent revision to Test method T631 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

# Test method T631

## Coring of road construction materials

### 1. Scope

This test method sets out the procedure for securing a cored sample of road construction material.

### 2. General

- (a) The method is applicable to road construction materials that have gained tensile strength and includes:
  - (i) Asphaltic concrete
  - (ii) Material blended with cementitious and/or bituminous binders
  - (iii) Self cementing materials (e.g. slag)

*NOTE: Specimens are sampled from a representative area unless otherwise specified.*

- (b) For coring concrete use AS 1012.14 unless otherwise specified
- (c) The method is applicable to “wet” or “dry” coring. Unless otherwise specified, the wet coring technique is to be used

*NOTE: Wet coring is generally used for materials with compressive strength  $\geq 5$  MPa. However, for lower strength materials dry coring (T632) is used to minimise damage to the core.*

- (d) The diameter of core must comply with the specification or subsequent test requirements (e.g. the maximum particle size  $< \square$  diameter of core, consistent size of sample)

### 3. Apparatus

- (a) Coring machine fitted with motor-driven head, a core barrel attachment of appropriate diameter and system for cooling and flushing the bit
- (b) Thin wall diamond tipped bits of the appropriate type for the material being cored with internal diameters to suit the specified diameter of specimen to test (e.g. 50, 75, 100 or 150 mm)
- (c) A source of cooling medium:
  - (i) For wet coring use water
  - (ii) For dry coring use compressed air (cylinder or compressor) at sufficient pressure to clear the cuttings but not damage the core
- (d) Containment system appropriate to the cooling medium
- (e) For coring hot asphalt at a temperature above 40°C, a system for chilling the cooling medium and one of the following to cool the material in situ:
  - (i) Dry ice
  - (ii) Liquid nitrogen and application system
- (f) Core lifter to remove the core without damage

*NOTE: A suitable design is a steel wire of appropriate length with a diameter that will fit into the space between the core and the material and be strong enough to lift the core. The wire should have a 90° bend to form a handle and a 90° bend at the bottom lift the core.*

*Screwdrivers, chisels or other tools that may damage the core must not be used.*

- (g) Hammer
- (h) Sealable container to protect the core from damage and moisture loss during transport. An insulated and cooled container is required for transporting asphalt samples in hot weather
- (i) For asphalt pavements a thermometer for measuring surface temperature

## 4. Preparation

- (a) Over the surface to be tested systematically mark out the sampling pattern for the test points
- (b) For asphalt cores:
  - (i) Mark each test point with an arrow in the direction of traffic flow

*NOTE: The marking must remain intact during the procedure.*

- (ii) Ensure the asphalt at the test point and for at least 40 mm wider than the diameter of the core is less than 40°C. Where asphalt is hotter than 40°C, cool the area using one of the following methods:

- Dry ice placed on the area

*NOTE: An initial thickness of 75 mm for at least 20 minutes.*

- Liquid nitrogen applied to the area

## 5. Procedure

### 5.1 Drilling

- (a) At the test point, set up the equipment to be perpendicular to the test surface. The sample must form a right cylinder with the top and bottom perpendicular to the axis

*NOTE: However, where cores are required for strength testing relocate to an adjacent site if cracking is detected.*

- (b) Attach the appropriate diameter thin wall bit
- (c) Connect the cooling system. For asphalt with a temperature 40°C or hotter, chill the cooling medium during the coring operation so that the material being cored is cooled to a temperature less than 40°C

*NOTE: Ice can be used to cool the water or air supply.*

- (d) Where required, install the containment system (e.g. to control runoff or dust)
- (e) Start the coring machine and operate it in accordance with the operating procedures so that the sample will not be weakened:
  - (i) Carefully lower the bit to just above the surface
  - (ii) Turn on and regulate the cooling medium
  - (iii) Commence coring by applying even and continuous downward pressure. Avoid overheating and jamming the barrel
  - (iv) Minimise lifting and replacing a bit to avoid producing corrugations on the core

*NOTE: Use only the minimum amount of cooling medium to cool the bit, lubricate or remove fine particles from around the bit, and prevent eroding the sample.*

*Avoid applying excessive pressure to the handle of the machine that may cause the core drill-stand to lift off the ground.*

- (f) Core to the required depth in one continuous motion. Ensure that the angle of cut does not change during coring

*NOTE: The full depth of bound layer is recommended.*

### 5.2 Completion and Removing Core

- (a) When the required depth has been reached or if the core breaks:
  - (i) Turn off the cooling medium and stop the core drill
  - (ii) Withdraw the bit from the hole
  - (iii) Remove the core without distorting or damaging the core

*NOTE: If the core is bonded to an underlying layer of material insert the core lifter between the core and the wall of the core and lever the core carefully so as to avoid damaging the core. If the core refuses to release then re-commence*

*cutting to a depth where release can be obtained. If the core still fails to release cut an adjacent hole so that a new angle of leverage can be applied to the core.*

*To remove cores in the barrel, lightly tap the outside of the core barrel with a hammer. If the core remains in the pavement, use a core removal device.*

- (b) Place samples on their side on a smooth horizontal surface
- (c) Mark each core with a sample number and indicate the upper surface. For asphalt cores also mark the direction of traffic
- (d) Inspect each core and note the following:
  - (i) The length of the complete core to the nearest 5 mm
  - (ii) Layers present in the core and the thicknesses of each to nearest 5 mm
  - (iii) Particles with any dimension  $> \frac{1}{3}$  the diameter of core
  - (iv) Any defects (e.g. cracks, voids, attrition, laminations, geotextile, foreign inclusion, clay lumps, unmixed binder)

*NOTE: Carefully handle the cores to avoid damage*

- (e) Secure the core in the sealed container and ensure the core is not damaged in transit and does not dry out

*NOTE: For asphalt cores during hot weather use an insulated and cooled container.*

- (f) Where a core is required for strength testing and is unsuitable (e.g. cracking, crumbles), relocate to an adjacent location and repeat Step **Error! Reference source not found.**
- (g) Repair the test hole

*NOTE: The repair is cement or bitumen based dense graded material, compacted to provide similar strength to the pavement and provide a waterproof capping.*

## 6. Calculations

Not used in this Test Method.

## 7. Reporting

Include the following information, data and results in the report:

- (a) Core identification
- (b) Location of sample (i.e. chainage and offset)
- (c) Date and time of core
- (d) Type of material
- (e) Nominal diameter of core to the nearest mm
- (f) Depth of layer to the nearest 10 mm
- (g) Results from each inspection in Clause 5.2(d):
  - (i) Length of core to nearest 5 mm
  - (ii) Layers and thicknesses to nearest 5 mm
  - (iii) Particles  $> 1/3$  the diameter of core
  - (iv) Defects
- (h) Name of coring operator
- (i) Reference to this test method